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Claims

A compound of the formula VI: 1.

wherein 5

A is $C(=0)OR^1$, $C(=0)NHSO_2R^2$, $C(=0)NHR^3$, or $CR^4R^{4'}$ wherein;

R¹ is hydrogen, C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl, C₀-C₃alkylheterocyclyl;

 R^2 is C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl;

 R^3 is C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl, -OC $_1$ -C $_6$ alkyl, -OCo-

C₃alkylcarbocyclyl, -OC₀-C₃alkylheterocyclyl; 10

R⁴ is halo, amino, or OH; or R⁴ and R^{4'} together are =O;

 $R^{4'}$ is C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl;

wherein R², R³, and R^{4'} are each optionally substituted from 1 to 3 substituents independently selected from the group consisting of halo, oxo, nitrile, azido, nitro, C₁-

C₆alkyl, C₀-C₃alkylcarbocyclyl, C₀-C₃alkylheterocyclyl, NH₂C(=O)-, Y-NRaRb, Y-O-15 R_b, Y-C(=O)Rb, Y-(C=O)NRaRb, Y-NRaC(=O)Rb, Y-NHSO_pRb, Y-S(=O)_pRb, Y-S(=O)_pNRaRb, Y-C(=O)Orb and Y-NRaC(=O)ORb;

Y is independently a bond or C₁-C₃alkylene;

Ra is independently H or C₁-C₃alkyl;

Rb is independently H, C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl or C₀-C₃alkylheterocyclyl; 20 p is independently 1 or 2;

M is CR⁷R⁷ or NRu;

Ru is H or C₁-C₃alkyl;

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 R^7 is C_1 - C_6 alkyl, C_0 - C_3 alkyl C_3 - C_7 cycloalkyl, or C_2 - C_6 alkenyl, any of which is optionally substituted with 1-3 halo atoms, or an amino, –SH or C_0 - C_3 alkylcycloalkyl group; or R^7 is J:

 $R^{7'}$ is H or taken together with R^{7} forms a C_3 - C_6 cycloalkyl ring optionally substituted with $R^{7'a}$ wherein;

 $R^{7'a}$ is C_1 - C_6 alkyl, C_3 - C_5 cycloalkyl, C_2 - C_6 alkenyl any of which may be optionally substituted with halo; or $R^{7'a}$ is J;

q' is 0 or 1 and k is 0 to 3;

Rz is H, or together with the asterisked carbon forms an olefinic bond;

10 Rq is H or C₁-C₆alkyl;

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W is -CH₂-, -O-, -OC(=O)H-, -OC(=O)-, -S-, -NH-, -NRa, -NHSO₂-, -NHC(=O)NH- or -NHC(=O)-, -NHC(=S)NH- or a bond;

R⁸ is a ring system containing 1 or 2 saturated, partially saturated or unsaturated rings each of which has 4-7 ring atoms and each of which has 0 to 4 hetero atoms

selected from S, O and N, the ring system being optionally spaced from W by a C_1 - C_3 alkyl group; or R^8 is C_1 - C_6 alkyl; any of which R^8 groups can be optionally mono, di, or tri substituted with R^9 , wherein

 R^9 is independently selected from the group consisting of halo, oxo, nitrile, azido, nitro, C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl, $NH_2C(=0)$ -, Y-

NRaRb, Y-O-Rb, Y-C(=O)Rb, Y-(C=O)NRaRb, Y-NRaC(=O)Rb, Y-NHSO_pRb, Y-S(=O)_pRb, Y-S(=O)_pNRaRb, Y-C(=O)ORb and Y-NRaC(=O)ORb; wherein said carbocyclyl or heterocyclyl moeity is optionally substituted with R¹⁰; wherein R¹⁰ is C₁-C₆alkyl, C₃-C₇cycloalkyl, C₁-C₆alkoxy, amino, sulfonyl, (C₁-C₃ alkyl)sulfonyl, NO₂, OH, SH, halo, haloalkyl, carboxyl, amido;

25 Rx is H or C_1 - C_5 alkyl; or Rx is J;

T is -CHR¹¹- or -NRd-, where Rd is H, C₁-C₃alkyl or Rd is J; R¹¹ is H or R¹¹ is C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl, C₀-C₃alkylheterocyclyl, any of which can be substituted with 1 to 3 substituents independently selected from the group consisting of halo, oxo, nitrile, azido, nitro, C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl,

30 C₀-C₃alkylheterocyclyl, NH₂CO-, Y-NRaRb, Y-O-Rb, Y-C(=O)Rb, Y-(C=O)NRaRb, Y-

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NRaC(=O)Rb, Y-NHSO_pRb, Y-S(=O)_pRb, Y-S(=O)_pNRaRb, Y-C(=O)ORb, Y-NRaC(=O)ORb; or \mathbb{R}^{11} is J;

J, if present, is a single 3 to 10-membered saturated or partially unsaturated alkylene chain extending from the R⁷/R⁷ cycloalkyl, or from the carbon atom to which R⁷ is attached to one of Rd, Rj, Rx, Ry or R¹¹ to form a macrocycle, which chain is optionally interrupted by one to three heteroatoms independently selected from: -O-, -S- or -NR¹²-,and wherein 0 to 3 carbon atoms in the chain are optionally substituted with R¹⁴; wherein;

R¹² is H, C₁-C₆ alkyl, C₃-C₆cycloalkyl, or COR¹³;

 $R^{13} \text{ is } C_1\text{-}C_6\text{alkyl}, \ C_0\text{-}C_3\text{alkylcarbocyclyl}, \ C_0\text{-}C_3\text{alkylheterocyclyl}; \\ R^{14} \text{ is independently selected from H, } C_1\text{-}C_6\text{alkyl}, \ C_1\text{-}C_6\text{haloalkyl}, \ C_1\text{-}C_6\text{alkoxy}, \\ \text{hydroxy, halo, amino, oxo, thio, or } C_1\text{-}C_6\text{ thioalkyl}; \\ \text{m is 0 or 1; n is 0 or 1;}$

U is O or is absent;

R¹⁵ is H, C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl, C₀-C₃alkylheterocyclyl, any of which can be substituted with 1 to 3 substituents independently selected from the group consisting of halo, oxo, nitrile, azido, nitro, C₁-C₆ alkyl, C₀-C₃alkylheterocyclyl, C₀-C₃alkylcarbocyclyl, NH₂C(=O)-, Y-NRaRb, Y-O-Rb, Y-C(=O)Rb, Y-(C=O)NRaRb, Y-NRaC(=O)Rb, Y-NHSO_pRb, Y-S(=O)_pRb, Y-S(=O)_pNRaRb, Y-C(=O)ORb and Y-

20 NRaC(=O)ORb;

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G is -O-, -NRy-, -NRjNRj-;

Ry is H, C_1 - C_3 alkyl; or Ry is J;

one Rj is H and the other Rj is H or J;

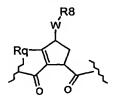
 R^{16} is H; or R^{16} is C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl, any of which can be substituted with halo, oxo, nitrile, azido, nitro, C_1 - C_6 alkyl, C_0 - C_3 alkylcarbocyclyl, C_0 - C_3 alkylheterocyclyl, NH_2CO -, Y-NRaRb, Y-O-Rb, Y-C(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb, Y-RaC(=O)Rb)

or a pharmaceutically acceptable salt or prodrug thereof.

2. A compound according to claim 1, where M is CR⁷R⁷.

3. A compound according to claim 1, with the partial structure:

4. A compound according to claim 1, with the partial structure



- 5. A compound according to claim 4, wherein Rq is C₁-C₃ alkyl, preferably methyl.
- 6. A compound according to claim 1, wherein m is 0 and n is 0.
- 10 7. A compound according to claim 6, wherein G is -NRy- or -NRjNRj-.
 - 8. A compound according to claim 7, where Ry or one of the Rj groups is J, thereby defining a macrocyclic compound.
- 15 9. A compound according to claim 7, wherein R^{16} is H, C_1 - C_6 alkyl or C_3 - C_6 cycloalkyl.
 - 10. A compound according to claim 1, wherein m is 1.
- 20 11. A compound according to claim 10, wherein U is O.
 - 12. A compound according to claim 10, wherein T is CR¹¹.
- 13. A compound according to claim 12, wherein R¹¹ is C₁-C₆alkyl, C₀-C₃alkylcarbocyclyl, C₀-C₃alkylaryl or C₀-C₃alkylheteroaryl, any of which is optionally

substituted with halo, amino, C_1 - C_6 alkoxy, C_1 - C_6 thioalkyl, COOR¹⁴, carboxyl, (C_1 - C_6 alkoxy)carbonyl, aryl, heteroaryl or heterocyclyl; or especially substituted with hydroxyl or COOR¹⁴.

- 14. A compound according to claim 13, wherein R¹¹ is tert-butyl, iso-butyl, cyclohexyl, phenylethyl, 2,2-dimetyl-propyl, cyclohexylmethyl, phenylmethyl, 2-pyridylmethyl, 4-hydroxy-phenylmethyl, or carboxylpropyl, especially tert-butyl, iso-butyl, or cyclohexyl.
- 10 15. A compound according to claim 10, wherein one of Rd, Rx or R¹¹ is J, thereby defining a macrocyclic compound.
 - 16. A compound according to claim 10, wherein n is 1.
- 15 17. A compound according to claim 16, wherein R¹⁵ is C₁-C₆alkyl or C₀-C₃alkylcarbocyclyl, either of which is optionally substituted.
 - 18. A compound according to claim 17, wherein R¹⁵ is cyclohexyl, cyclohexylmethyl, tert-butyl, iso-propyl, or iso-butyl.
 - 19. A compound according to claim 10, wherein G is NRy or NRjNRj, where Ry or one Rj is H or methyl and the other is H.
- 20. A compound according to claim 19, wherein R¹⁶ is H, C₁-C₆alkyl or a 5 or 6 membered heterocycle, especially morpholine, piperidine or piperazine.
 - 21. A compound according to claim 10, wherein R^{16} is C_1 - C_6 alkyl, C_0 - C_3 alkylheterocyclyl, C_0 - C_3 alkylcarbocyclyl, any of which is optionally substituted with hydroxy, halo, amino, or C_1 - C_6 alkoxy.

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- 22. A compound according to claim 21, wherein R¹⁶ is 2-indanol, indanyl, 2-hydroxy-1-phenyl-ethyl, 2-thiophenemethyl, cyclohexylmethyl, 2,3-methylenedioxybenzyl, cyclohexyl, benzyl, 2-pyridylmethyl, cyclobutyl, iso-butyl, n-propyl, or 4-methoxyphenylethyl.
- 23. A compound according to claim 1, wherein W is -OC(=O)-, -NRa-, $-NHS(O)_2$ -or -NHC(=O)-; or especially -OC(=O)NH- or -NH.
- 24. A compound according to claim 1, wherein W is -S-, a bond or especially -O-.
- 25. A compound according to claim 23 or 24 wherein R^8 is optionally substituted C_0 - C_3 -alkylcarbocyclyl or optionally substituted C_0 - C_3 -alkylheterocyclyl.
- 26. A compound according to claim 25, wherein the C₀-C₃ alkyl moiety is methylene or preferably a bond.
 - 27 A compound according to claim 26 wherein R^8 is C_0 - C_3 alkylaryl, or C_0 - C_3 alkylheteroaryl, either of which is optionally mono, di, or tri substituted with R^9 , wherein;
- 20 R⁹ is C₁-C₆ alkyl, C₁-C₆alkoxy, NO₂, OH, halo, trifluoromethyl, amino or amido optionally mono- or di-substituted with C₁-C₆alkyl, C₀-C₃alkylaryl, C₀-C₃alkylheteroaryl, carboxyl, aryl or heteroaryl being optionally substituted with R¹⁰; wherein
- R¹⁰ is C₁-C₆alkyl, C₃-C₇cycloalkyl, C₁-C₆alkoxy, amino optionally mono- or disubstituted with C₁-C₆alkyl, C₁-C₃ alkyl amide, sulfonylC₁-C₃alkyl, NO₂, OH, halo, trifluoromethyl, carboxyl, or heteroaryl.
- 28. A compound according to claim 27 wherein R⁹ is C₁-C₆ alkyl, C₁-C₆alkoxy, amino, di-(C₁-C₃ alkyl)amino, C₁-C₃alkylamide, aryl or heteroaryl, the aryl or heteroaryl being optionally substituted with R¹⁰; wherein

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 R^{10} is C_1 - C_6 alkyl, C_3 - C_7 cycloalkyl, C_1 - C_6 alkoxy, amino, mono- or di- C_1 - C_3 alkylamino, amido, C_1 - C_3 alkylamide, halo, trifluoromethyl, or heteroaryl.

- 29. A compound according to claim 28, wherein, R^{10} is C_1 - C_6 alkyl, C_1 - C_6 alkoxy, amino optionally mono- or di substituted with C_1 - C_3 alkyl, amido, C_1 - C_3 -alkylamide, halo, or heteroaryl.
 - 30. A compound according to claim 29 wherein R^{10} is methyl, ethyl, isopropyl, tertbutyl, methoxy, chloro, amino optionally mono- or di substituted with C_1 - C_3 alkyl, amido, C_1 - C_3 alkylamide, or C_1 - C_3 alkyl thiazolyl.
 - A compound according to claim 26, wherein R⁸ is 1-naphthylmethyl, 2-naphthylmethyl, benzyl, 1-naphthyl, 2-naphthyl, or quinolinyl any of which is unsubstituted, mono, or disubstituted with R⁹ as defined.
 - 32 A compound according to claim 31 wherein R⁸ is 1-naphthylmethyl, or quinolinyl any of which is unsubstituted, mono, or disubstituted with R⁹ as defined.
 - 33 A compound according to claim 32 wherein R⁸ is:

wherein R^{9a} is C₁-C₆ alkyl; C₁-C₆alkoxy; thioC₁-C₃alkyl; amino optionally substituted with C₁-C₆alkyl; C₀-C₃alkylaryl; or C₀-C₃alkylheteroaryl, C₀-C₃alkylheterocyclyl, said aryl, heteroaryl or heterocycle being optionally substituted with R¹⁰ wherein R¹⁰ is C₁-C₆alkyl, C₀-C₃alkylC₃-C₇cycloalkyl, C₁-C₆alkoxy, amino optionally mono- or di-substituted with C₁-C₆alkyl, amido, C₁-C₃alkyl amide; and

 R^{9b} is C_1 - C_6 alkyl, C_1 - C_6 -alkoxy, amino, di(C_1 - C_3 alkyl)amino, (C_1 - C_3 alkyl) amide, NO_2 , OH, halo, trifluoromethyl, carboxyl.

- 34 A compound according to claim 33, wherein R^{9a} is aryl or heteroaryl, either of which is optionally substituted with R^{10} as defined.
- A compound according to 34, wherein R^{9a} is selected from the group consisted of:

wherein R^{10} is H, C_1 - C_6 alkyl, or C_0 - C_3 alkylcycloalkyl, amino optionally mono- or disubstituted with C_1 - C_6 alkyl, amido, (C_1 - C_3 alkyl)amide.

- 10 36. A compound according to claim 34, wherein R^{9a} is optionally substituted phenyl, preferably phenyl substituted with C₁-C₆alkyl; C₁-C₆alkoxy; or halo.
 - 37. A compound according to claim 33, wherein R⁸ is:

- wherein R^{10a} is H, C₁-C₆alkyl, or C₀-C₃alkylcarbocyclyl, amino optionally mono- or disubstituted with C₁-C₆alkyl, amido, (C₁-C₃ alkyl)amide, heteroaryl or heterocyclyl; and R^{9b} is C₁-C₆ alkyl, C₁-C₆-alkoxy, amino, di(C₁-C₃ alkyl)amino, (C₁-C₃ alkyl)amide, NO₂, OH, halo, trifluoromethyl, or carboxyl.
- 20 38. A compound according to any claim 33, wherein R^{9b} is C_1 - C_6 -alkoxy, preferably methoxy.
 - 39. A compound according to claim 1, wherein A is C(=O)NHSO₂R².

- 40. A compound according to claim 39, wherein R^2 is optionally substituted C_1 - C_6 alkyl, preferably methyl.
- 41. A compound according to claim 39, wherein R² is optionally substituted C₃5 C₇cycloalkyl, preferably cyclopropyl.
 - 42. A compound according to claim 39, wherein R^2 is optionally substituted C_0 - C_6 alkylaryl, preferably optionally substituted phenyl.
- 10 43. A compound according to claim 1, wherein A is C(=O)OR¹.
 - 44. A compound according to claim 43, wherein R^1 is H or C_1 - C_6 alkyl, preferably hydrogen, methyl, ethyl, or tert-butyl.
- 15 45. A compound according to claim 2, wherein R^{7'} is H and R⁷ is n-ethyl, cyclopropylmethyl, cyclobutylmethyl or mercaptomethyl, preferably n-propyl or 2,2-difluoroethyl.
- 46. A compound according to claim 2, wherein R⁷ and R^{7'} together define a spiro-cyclopropyl or spiro-cyclobutyl ring, both optionally mono or di-substituted with R^{7'a} wherein;
 - $R^{7'a}$ is C_1 - C_6 alkyl, C_3 - C_5 cycloalkyl, or C_2 - C_6 alkenyl, any of which is optionally substituted with halo; or R^{7a} is J.
- 25 47. A compound according to claim 47 wherein the ring is a spiro-cyclopropyl ring substituted with R⁷'a wherein; R⁷'a is ethyl, vinyl, cyclopropyl, 1- or 2-bromoethyl, 1-or 2-fluoroethyl, 2-bromovinyl or 2-fluorethyl.
- 30 48. A compound according to claim 2, wherein R⁷ is J and R^{7'} is H.

49. A compound according to claim 1, wherein J is a 3 to 8-membered saturated or unsaturated alkylene chain optionally containing one to two heteroatoms independently selected from: -O-, -S- or -NR¹²-, wherein R¹² is H, C_1 - C_6 alkyl, such as methyl, or -C(=O) C_1 - C_6 alkyl, such as acetyl.

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- 50. A compound according to claim 49, wherein J is a 4 to 7-membered saturated or unsaturated, all carbon alkylene chain.
- 51. A compound according to claim 49, wherein J is saturated or monounsaturated.
 - 52. A compound according to claim 49, wherein J is dimensioned to provide a macrocycle of 14 or 15 ring atoms.
- 15 53. A pharmaceutical composition comprising a compound as defined in claim 1 and a pharmaceutically acceptable carrier therefor.
 - 54. A pharmaceutical composition according to claim 53, further comprising an additional HCV antiviral, selected from nucleoside analogue polymerase inhibitors, protease inhibitors, ribavirin and interferon.
 - 55. Use of a compound as defined in claim 1 in therapy.
- 56. Use of a compound as defined in claim 1 in the manufacture of a medicament for the prophylaxis or treatment of flavivirus infections, including HCV.
 - 57. A method for treatment or prophylaxis of flavivirus infection such as HCV comprising the administration of an effective amount of a compound as defined in claim 1 to an individual afflicted or at risk of such infection.